

7 Natural and Environmental Conditions

Introduction

Murray City’s water bodies and other natural features provide beauty and pleasure to its residents, but can also be the cause of serious problems in the absence of careful planning. Some of the natural hazards that may impact Murray include earthquake, flooding, and soil related hazards such as land settling, landslides, erosion and high water table. Often, much of the damage that can occur is a result of a lack of proper planning, improper mitigation, and a disregard for natural systems. Careful planning and development can minimize the impacts of these natural occurrences. This chapter provides a generalized analysis of environmental suitability based on known constraints and natural hazards.

Existing Conditions

Setting and Topography

Murray is located in the heart of the Salt Lake Valley. The city is nearly built out with a broad mix of commercial, residential and industrial uses. The topography is generally gentle, sloping westward from the nearby Wasatch Mountains toward the Jordan River, which is the terminal river feature in the Salt Lake Valley. Big Cottonwood and Little Cottonwood Creeks join the Jordan River within Murray City boundaries, following routes between properties, along streets, and through parks and open spaces.

Earthquakes

Lying at the base of the Wasatch Mountains, and located approximately three miles to the East of Murray is the Wasatch Fault. This fault holds the potential of releasing its energy in the form of a significant earthquake. This earthquake potential makes it necessary to carefully consider the potential hazards to development.

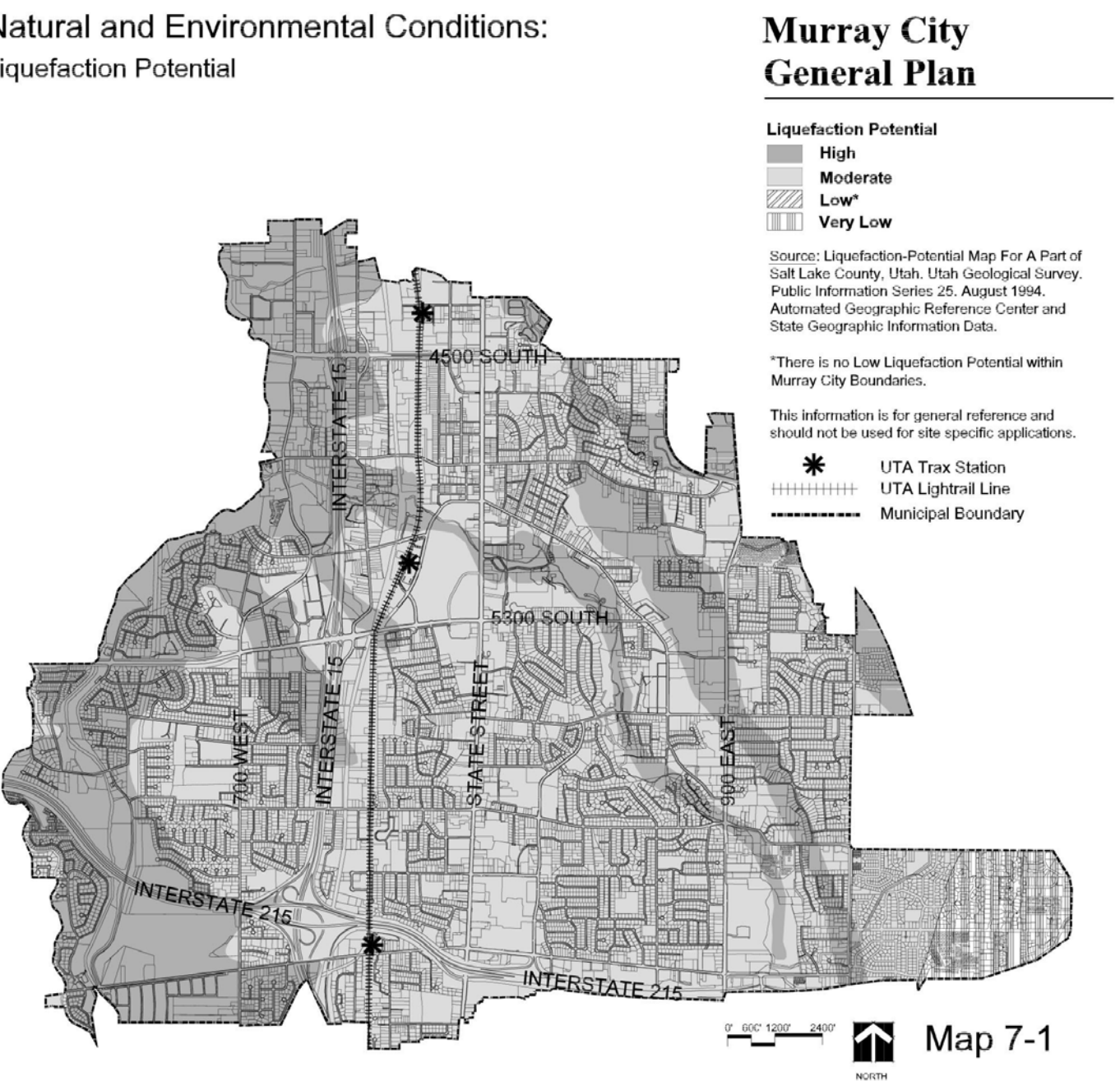
Earthquakes can cause injury, death and property damage. Much of the death, injuries, and loss of property are a result of building failure during the course of an earthquake and the following aftershocks. Earthquake conditions that cause building failure include surface rupture, ground shaking, landslides, earth settlement, and liquefaction. Liquefaction is a particular danger to Murray because of the close proximity of the Wasatch fault and the rivers and streams that flow through the city. Liquefaction potential maps from the Utah Geological Survey show that the majority of Murray City is in either High or Moderate Liquefaction zones (see Map 7-1). Policies are in place to minimize the potential impacts on structures.

Urban Runoff

Characteristics and conveyance of storm water from developed areas has become an increasing concern due to adverse impacts to natural waterways and receiving waters. Murray City has natural streams and rivers and man-made irrigation canals crossing its boundaries. As these waterways convey storm water runoff, they undergo physical alterations that can increase frequency of bankfill flows and increase the potential for property damage as a result of flooding.

Land use changes in the drainage basins affect the amount and type of pollutants conveyed to receiving waters. The discharge of these pollutants can degrade water quality in the streams and rivers, resulting in loss of aquatic habitat and biological resources, losses of beneficial use, and negative impacts to the

Natural and Environmental Conditions:
Liquefaction Potential



aesthetic appearance of urban waterways. Both storm water quality and water quantity best management practices are currently being developed and implemented by Murray City.

Flooding

Flooding has become a more serious problem as growth and development has encroached upon the natural waterways. This has become a problem for two main reasons. First, the natural beauty of waterways increases the desirability of development. Second, as growth continues the availability of lands decreases, often pushing development into areas that are less suitable for development. This not only degrades the natural environment but also increases the potential for property damage to occur as a result of flooding. The flood potential in Murray is high in many areas because Big and Little Cottonwood Creeks

run directly through portions of the city and the Jordan River runs along much of the western boundary of Murray.

Floodplains and the Jordan River Meander Corridor

Murray City currently uses the “Flood Insurance Rate Maps” or FIRM’s to regulate development in the “area of special flood hazard” zones. This zone, as defined by the Federal Emergency Management Agency (FEMA), includes the “floodway” which is the channel of the river (creek) and the adjacent floodplain that must be reserved in an unobstructed condition in order to discharge the base flood (100 year) without increasing flood levels by more than one foot, and the land in the area of the 100 year flood plain (see Map 7-2). In addition to FEMA, The Salt Lake County Jordan River Flood Channel Management Ordinance also regulates flood control along the Jordan River. This ordinance established the Jordan River Meander Corridor (see Map 7-2) and regulates flood prevention and development within this corridor. The Jordan River Meander Corridor delineates the historical extent of the Jordan River channel. Any development proposed within this boundary must undergo additional investigations, with assurances that development will not be threatened by changes in the meander. These requirements can significantly raise development costs.

Wetlands

Several wetland sites are located within Murray City boundaries (see Map 7-2). Wetlands are important for many reasons. They provide sanctuary for many forms of plant and animal life and often serve as catchments to flood waters during flooding. Federal Laws require that there be no net loss of wetlands. This means that if a designated wetland is eliminated, another wetland site must be acquired and preserved to replace the site that is lost. Wetlands are under the jurisdiction of The U.S Army Corp of Engineers and proposed development near and in wetland areas will be required to obtain a permit prior to proceeding. This insures that these sites will not be compromised by development.

Soil Related Hazards and Constraints

Soil related hazards and constraints have the potential to affect all of Murray. Some of the constraints used to determine susceptibility in Murray include:

- Water table of 30” or less
- Rock Outcrops
- Bedrock Depths of less than 20”
- Soils with high shrink-swell potential
- Very high or high erosion hazard
- Strong salt or alkali effect
- Very rapid or rapid permeability
- Impermeable, very slow, or slow permeability
- High water runoff potential
- Susceptibility to hillside slippage

Each of these constraints can increase development costs and increase the possibility of property damage. Many of these soil constraints often increase the potential damage that may be caused by other hazards such as earthquakes and floods. These constraints will not usually make property unsuitable for development but they will add expense and at times may limit the type of development on a property. It is important that these issues are considered in the planning process and policies are in place to regulate development so that potential hazards can be minimized. Map 7-2 indicates areas affected by soil related hazards and constraints.

Former Smelter Sites and Other Hazardous Sites

The smelting industry played a major role in the economy and development of Murray City. The smokestacks of the American Smelting and Refining Company (ASARCO) near 5300 South served as a major landmark in Murray until August of 2000 when they were demolished. Murray City was home to as many as ten different smelters. All of the smelters have now been closed for several decades. Concern regarding the impact of smelters and similar industries on health and the environment prompted the United States Congress to pass the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (known as CERCLA or Superfund). “CERCLA:

- established prohibitions and requirements concerning closed and abandoned hazardous waste sites;
- provided for liability of persons responsible for releases of hazardous waste at these sites; and
- established a trust fund to provide for cleanup when no responsible party could be identified” (<http://www.epa.gov/superfund/action/law/cercla.htm>).

This Act also designated the Environmental Protection Agency (EPA) as the regulatory agency for any sites to be regulated by the CERCLA.

As illustrated on Map 7-2, Murray City has a number of sites listed in the Comprehensive Environmental Response, Compensation and Liability Information System Database (CERCLIS), which is a database used by the U.S. Environmental Protection Agency (EPA) to track activities conducted under its Superfund program (CERCLA). Specific information is tracked for each individual site. Sites which come to EPA's attention because of a potential for releasing hazardous substances into the environment are added to the CERCLIS inventory. EPA learns of these sites through notification by the owner, citizen complaints, state and local government identification, and investigations by EPA programs other than Superfund” (EPA website, <http://www.epa.gov>). If a site is listed on the National Priorities Listing (NPL) it is eligible to receive Superfund funding. However, many sites listed in CERCLIS do not meet the requirements necessary to be a NPL site. Many of these sites are then classified by the EPA as “No Further Remedial Action Planned” (NFRAP). This does not mean they do not need remediation. It simply means they are a low priority and do not qualify to be funded by Superfund. A number of CERCLIS sites in Murray fall under the NFRAP category. They will remain listed in CERCLIS until either proper remediation takes place or until it can be determined that no remediation is necessary. However, Superfund is not the only alternative to receive funding for hazardous sites. There are many other cleanup and remedial programs regulated through the federal government and the Utah Department of Environmental Quality.

Murray City, the Environmental Protection Agency, and the Utah Department of Environmental Quality have addressed the necessary sites within Murray City limits. Guidelines and restrictions pertaining to development on former smelter or other hazardous sites are set forth in the current Murray City Zoning Ordinance.

Analysis

The Generalized Development Suitability Analysis (see Map 7-2) identifies areas “Generally Suitable for Development” and “Generally Unsuitable for Development”. This can be helpful in identifying appropriate land uses for areas within Murray City.

The suitability classifications were created based on the information of the natural hazards and environmental constraints. It is a combination of flood plains and wetlands, soil related hazards and constraints, and topography. Earthquake and liquefaction potential were not factored into the classifications

because the majority of Murray City has relatively the same earthquake potential and is located in a high or moderate liquefaction zone. The classification criteria are as follows:

- Generally Suitable – Not located within the “area of special flood hazard” or a wetland, has three or fewer soil related hazards and constraints, and no steep slopes.
- Generally Unsuitable- Located within the “area of special flood hazard,” the “floodway,” a wetland, has four or more soil related hazards and constraints, a Du or Gp soil type, or steep slopes.

Recommendations

As a community approaching build-out, Murray has, to a large degree, dealt with its environmental setting and natural hazards. Continued diligence in monitoring identified problem areas, responding to new and refined information, and incorporating new technologies are recommended as a general approach to avoid future problems. Development and re-development activities should include site design and engineering controls for any of the natural site constraints or hazards. In particular, any development or redevelopment activities should include site design and engineering controls to reduce water quality impacts to the natural environment, to the maximum extent practicable.

Goals and Policies

- Goal:

Evaluate and update, as needed, current regulations and guidelines pertaining to development and building in areas with earthquake potential.
- Policy:

Regulate future development by following Uniform Building Code seismic provisions.
- Goal:

Evaluate and update, as needed, current regulations and guidelines pertaining to development within “areas of special flood hazard” and “floodways”.
- Policy:

Regulate development in “areas of special flood hazard” and “floodways” by following the guidelines of the Federal Emergency Management Agency and the “Flood Insurance Rate Maps.”
- Goal:

Evaluate and update, as needed, current regulations and guidelines pertaining to development within wetland areas.
- Policy:

Regulate development in wetlands by following the guidelines of the U.S. Army Corp of Engineers.
- Goal:

Protect areas from development that are unsuitable or less suitable for development.
- Policy:

Recognize the hazards of development on unsuitable and less suitable lands to people and property by adopting guidelines and regulations that will prevent development in areas that cannot be effectively mitigated and insure proper mitigation of site hazards and constraints where feasible.

- Goal:

Utilize unsuitable or less suitable lands for open space and trail corridors throughout the city.
- Policy:

Incorporate unsuitable and less suitable lands into the Parks, Recreation and Trails element of the General Plan.

Implementation Measure: Identify areas of unsuitable or less suitable lands that will be key areas for Parks, Recreation, and Trails corridor development.
- Goal:

Minimize the impacts of growth and development on water quality.
- Policy:

Regulate the impacts on water quality by adopting guidelines and regulations that will reduce water quality impacts to the maximum extent possible.

Implementation Measure: As part of the water quality regulations and guidelines, require a planning review process that addresses site design and engineering controls to reduce water quality impacts.